WHAT IS CLAIMED:

1. A tube stock, comprising:

an elongate tubular shell having at least a portion thereof constructed of a structural material having an average grain size of less than 64 microns.

2. A tube stock, comprising:

an annular wall forming a tube, at least a portion of the annular wall being constructed of a grain material, the annular wall having an average thickness of eight or more grains.

3. A method of manufacturing tube stock for subsequent use as an intravascular stent, comprising:

selecting a thermal spray processing apparatus from the group of materials consisting of cold spray, combustion, hvof, arc, and plasma;

thermally spray-forming material selected from the group of materials consisting of metals, metal alloys, polymers, ceramics, and cermets onto a mandrel to form the tube stock; and

removing the tube stock from the mandrel after it is formed.

4. The method of claim 3, wherein the tube stock is removed from the mandrel by melting the mandrel.

5. The method of claim 3, wherein the tube stock is removed from the mandrel by cooling the mandrel to decrease the mandrel diameter.

6. The method of claim 3, wherein the tube stock is removed from the mandrel by heating the tube stock to increase the diameter of the tube stock.

7. The method of claim 3, wherein the tube stock is removed from the mandrel by heating the tube stock to increase the diameter of the tube and cooling the mandrel to decrease the mandrel diameter.

8. The method of claim 3, wherein the tube stock is removed from the mandrel by the process of cross-rolling.

9. The method of claim 3, wherein the tube stock slides off the mandrel.

10. The method of claim 3, wherein before the tube stock is removed from the mandrel the tube stock is swaged in order to develop appropriate mechanical properties.

11. The method of claim 3, wherein before the tube stock is removed from the mandrel the tube stock is subjected to high mechanical pressure to develop appropriate mechanical properties.

12. The method of claim 3, wherein before or after the tube stock is removed from the mandrel the tube stock is placed in a traveling ring furnace for tempering and hardening.

13. The method of claim 3, wherein before or after the tube stock is removed from the mandrel the outer diameter of the tube stock is machined to a predetermined size.

14. The method of claim 3, wherein after the tube stock is removed from the mandrel the inner diameter of the tube stock is bored.

15. The method of claim 3, wherein after the tube stock is removed from the mandrel the inner diameter of the tube stock is reamed.

16. The method of claim 3, wherein before or after the tube stock is removed from the mandrel the tube stock is machined.

17. The method of claim 3, wherein before or after the tube stock is removed from the mandrel the tube stock is ground.

18. The method of claim 3, wherein after the tube stock is removed from the mandrel the tube stock is drawn.

19. A tube stock, comprising:

a tubular shell having an annular wall the thickness of which being at least eight grains and the average diameter of the grains being less than 64 microns.

20. The tube stock of claim 19, wherein the tubular shell is processed to form a medical device taken from the group of devices including stents, guide wires, catheters, markers, and lead tips.

21. A wire, comprising:

an elongated wire formed of grains and having a diameter of at least nine grains where the average diameter of the grains is less than 64 microns.

22. The wire of claim 21, wherein the wire is processed to form a medical device taken from the group of devices including stents, guide wires, catheters, markers, and lead tips.

23. A method of manufacturing tube stock through cold spray thermal processing, comprising:

introducing particles of a powder of at least one first material selected from the group consisting of metals, metal alloys, and polymers, with the particle size ranging from about 1 to 64 microns, into a gas selected from the group consisting of Nitrogen (N_2), Oxygen (O_2), Air, Helium (He), Argon (Ar), Xenon (Xe), and Carbon Dioxide (CO_2);

introducing the gas and particles into a supersonic nozzle with an inlet temperature between 380 to 420° Celsius, at an inlet velocity from about 300 to about 1,200 m/sec, and an inlet pressure of 1.5 to 2.5 Mpa to form a high-pressure stream;

directing the high pressure stream onto a mandrel, the distance between the nozzle and the mandrel being approximately 8 to 10 mm, and coating the mandrel with the particles to form the tube stock; and

removing the tube stock from the mandrel after it is formed.

24. A coated intravascular stent, the coating comprising:

a metallic coating material formed of grains where the average grain size is less than 64 microns.

25. A method of coating a medical device, comprising:

thermally spray-forming material onto the medical device to form the coating where the type of thermal spray processing is selected from the group consisting of cold spray, combustion, hvof, arc, and plasma and where the material forming the coating is selected from the group consisting of metals, metal alloys, polymers, ceramics, and cermets.

26. The method of claim 25, wherein the thickness of the coating is varied on the medical device.

27. The method of claim 25, wherein the thickness of the coating is varied along a length of the medical device.

28. The method of claim 25, wherein metallic alloys are sprayed onto the medical device to form the coating.

29. The method of claim 25, wherein ceramic materials are sprayed onto the medical device to form the coating.

30. The method of claim 25, wherein composites are coated onto the medical device.

31. The method of claim 25, wherein polymers are coated onto the medical device.

32. The method of claim 25, wherein a metallic coating is heated and grains are grown after the coating is sprayed onto the medical device.

33. The method of claim 25, wherein the medical device is swaged after coating.

34. The method of claim 25, wherein the medical device is drawn after coating.

35. The method of claim 34, wherein the medical device is annealed after being coated.

36. The method of claim 25, wherein the medical device is heated for post-processing after being coated.

37. The method of claim 25, wherein after coating, the medical device is cross-link processed.

38. The method of claim 25, wherein after coating, the medical device is post processed in a traveling ring furnace where the material is melted and re-solidified as the ring travels the length of the medical device.

39. The method of claim 25, wherein after coating the medical device is processed under high mechanical pressure in a vacuum to sinter grains of the medical device together.

40. The method of claim 25, wherein after coating an outer diameter of the medical device is post processed through centerless grinding.

41. The method of claim 25, wherein after coating an outer diameter of the medical device is post processed by drawing to reduce the coating thickness.

42. The method of claim 25, wherein after coating an inner diameter of the medical device is post processed by boring for improving both dimension and surface roughness.

43. A method of coating an intravascular stent through cold spray thermal processing, comprising:

introducing particles of a powder of at least one first material selected from the group consisting of metals, metal alloys, and polymers with a particle size from about 1 to 64 microns, into a gas selected from the group consisting of Nitrogen

(N_2), Oxygen (O_2), Air, Helium (He), Argon (Ar), Xenon (Xe), or Carbon Dioxide (CO_2);

introducing the gas and particles into a supersonic nozzle with an inlet temperature between 380 to 420° Celsius, at an inlet velocity from about 300 to about 1,200 m/sec, and an inlet pressure of 1.5 to 2.5 Mpa to form a high pressure stream;

directing the high pressure stream at a stent placed on a mandrel 8 to 10 mm away from the nozzle, the stent formed from a second material selected from the group consisting of a metal, an alloy and a polymer, and coating the stent with the particles to form a coated stent; and

removing the coated stent from the mandrel.

Add A1

Add B1